Are animals affected by radionuclides at Rocky Flats?

Transfer coefficients are the measure of contaminant concentrations in animal products (meat, milk, eggs) compared to the contaminant concentrations in animal feed. The measured or predicted animal transfer coefficients for americium, plutonium and uranium are low, but are not well-established. The oxide forms of radionuclides, the common form of plutonium in nature, are usually least bioavailable.

In 2002, the U. S. Fish and Wildlife Service conducted a study at Rocky Flats and at the Rocky Mountain Arsenal Refuge to determine activity levels of radionuclides in deer tissues. Twenty-six Rocky Flats deer were culled for the study and of the 454 analyses conducted on tissue samples, only 17 resulted in detections of low levels of radionuclides. Americium was detected in select lung, muscle, and kidney tissues of the Rocky Flats deer, and was also detected in kidney and liver tissues of deer analyzed at the Rocky Mountain Arsenal Refuge. Plutonium was only detected in bone samples from the Rocky Flats deer. Uranium was detected in select liver and muscle tissues of the Rocky Flats deer, and was also detected in liver tissue of the Rocky Mountain Arsenal Refuge deer.

The analytical results were also used to carry out a series of risk-based calculations to define human risks associated with ingesting these tissues. All liver and muscle tissues that yielded detections above the corresponding method detection limits were utilized to calculate risk values associated with the ingestion of these tissues. The risk calculations were based on one person eating five pounds of liver or 62 pounds of muscle from one deer in a year. The highest risk calculated in this exercise was attributed to americium in muscle tissue of one deer, with radioactivity levels of 0.000449 pCi/g equivalent to a 6.76 X 10-8 (0.0000000676) risk level. This level of risk corresponds with a 1 in 14,700,000 increased chance of cancer resulting from eating the deer muscle. If this same individual consumed similar amounts of contaminated deer tissue yearly, throughout his/her lifetime (70 years), this would result in a 4.73 X10-6 (0.00000473) risk level, or a 1 in 210,000 increased chance of cancer. These study results were determined before the major soil cleanup projects at the site and levels of these radioactive isotopes in deer tissues would be expected to decrease because contaminated soils have largely been removed.